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PATENT SPECIFICATION

418,293

Application Date: Jan. 17, 1933. No. 1593/33.

" " Feb. 16, 1933. No. 4847/33.

" " Feb. 16, 1934. No. 5178/34.

One Complete Left: Feb. 16, 1934.

Complete Accepted: Oct. 17, 1934.

PROVISIONAL SPECIFICATION.

No. 1593, A.D. 1933.

Improvements in or relating to Pneumatic Tyres for all Transport Vehicles.

I, JOHN MACMILLAN, 139, Station Road, Hendon, London, N.W.4, British Subject, do hereby declare the nature of this invention to be as follows:—

The desirability of a lower cross sectional height in the pneumatic tyre has been abundantly proved and before any new principle of construction can be considered practical it must meet the many varying conditions of everyday service on all kinds of roads and road surfaces and it must deliver at least the same mileage as a tyre of standard construction employing the same weight of material for a given load and costing not more than the same to manufacture. Road surfaces are being continually improved in every country but wavy surfaces can never be quite prevented from developing and vehicles will always be subjected to a vertical motion thus necessitating in any new construction of the pneumatic tyre the ability to flex freely and safely without fracturing the carcase. The necessity to greatly diminish side or lateral roll is self evident this motion contributing to danger as well as discomfort. Another necessity is to abolish danger arising from puncture or burst and a substantial reduction in the cross sectional height of the tyre which will bring the metal rim of the wheel nearer to the road surface whilst preserving the tyre's ability to flex freely under severe shock is the only safe method of preventing dangerous accidents. A further necessity is to provide a tyre which will permit the fitting of larger brake drums the heat from which will not destroy the tyre prematurely as in the case of the standard tyre and in order to avoid flywheel effect it is necessary to reduce the weight of material at the periphery of the wheel that is to say the tyre and rim to the minimum.

The cross sectional height and width of the air core of the standard tyre are equal or approximately equal, that is to say, the air core forms a complete circle and while many attempts have been made to manufacture a tyre cover having the cross section of the air core less than a full circle and as shallow as a semi-circle every such tyre has been found to be impracticable or severely deficient in mileage service. Similarly tyre covers manufactured with the air core of oval or rectangular shape having greater width than height in the cross section always fail when inflated to maintain their original dimensions as manufactured and any attempt to obtain a rectangular or flat air core at the tread part by means of circumferential wires or cords must from flexion result in a lesser mileage life than the standard tyre for the same load.

In order to solve these problems all of which are determined by the operation of natural laws interference with these laws is necessary and in my invention I construct the tyre cover in such manner that I restrict or negative the natural but undesired movements or displacements ordinarily arising when the tyre is inflated and in active service.

My new construction of the tyre cover permits the cross sectional height of the air core to be substantially less than that of the standard tyre for a given load and the same cross sectional width of cover may be manufactured in various cross sectional heights the air core varying from slightly less than a full circle to substantially less than half a circle including the base beads and when inflated will retain its original shape and dimensions as when uninflated, also the same area and weight of material as is used in the manufacture of a standard tyre of a given size can by my new construction produce a substantially wider cover having a wider

tread thereby carrying the load and overload of a standard tyre of greater dimensions costing much more to manufacture.

I construct my tyre cover having two hoops which may be of metal or of one or more wires or of cords encased in a suitable rubber compound and affixed circumferentially to the inside of the cover or load between the plies of the carcase one hoop adjacent to each bead. The diameters of these hoops are less than the extreme diameter of the beads at the adjacent points so that when the cover is inflated the arc of the air core is determined by the distance between these hoops and the length of material bridging them, the greater the length of material the smaller the arc and the higher the centre line height, the shorter the length of material the wider the arc with a correspondingly lower centre line height which results in a tyre cover having the tread part which although to the arc of a circle may be so shallow as to be almost flat and to become definitely flat at the point of road contact when under load. The cover at the inner circumference is by these hoops prevented from extending outwards from the rim.

Alternatively I may manufacture the tyre cover having the air core and tread as already described but without the hoops in which case I employ a novel inner tube to prevent displacement and distortion of the tyre cover as manufactured when inflated. I construct this inner tube haing the two hoops affixed circumferentially to the inside wall of the tube or embedded in the material of the tube at the same points and distance apart from each other as already described when the hoops are made integral with the tyre cover.

In another form of construction I manufacture the tyre cover in tube formation dispensing with an inner tube, the cover having the hoops affixed to or embedded in the carcase of the cover substantially as already described in which case the inner circumference of the cover may be manufactured flat or manufactured and moulded to conform to the arc of the circle at the tread part.

By means of this novel wider construction of the cross section side or lateral roll is checked the outer ribs of the wider tread only coming into road contact when the vehicle is cornering at speed and it is practically impossible for the vehicle of its own volition to turn turtle.

Pillar action on the side walls is totally impossible as the load is cushioned entirely on the air and because of the shortened length of material extending from bead to bead the cover is automatically rendered substantially stronger yet provides the maximum of deflexion required as even when the tyre is deflected to the point of collapse the carcase positively cannot break, further the shortened length of material enables a much lower cost of production to be obtained.

The cross sectional height of the air core of my tyre cover may be but need not be any higher than is required to permit maximum safe deflexion thus an exceedingly shallow tyre which will retain its original shape and dimensions when inflated is for the first time rendered practical and because of the reduced weight at the periphery of the wheel flywheel effect does not arise.

This new construction of the tyre cover can be fitted to standard rims and wheels and because of the greater diameter at the beads much larger brake drums can be used.

The tyre cover and tube may be manufactured in all required dimensions.

Dated the sixteenth day of January, 1933.

JOHN MACMILLAN.

PROVISIONAL SPECIFICATION.

No. 4847, A.D. 1933.

Improvements in or relating to Pneumatic Tyres.

I, JOHN MACMILLAN, a British Subject, of 139, Station Road, Hendon, London, N.W. 4, do hereby declare the nature of this invention to be as follows:—

This invention is for improvements in or relating to pneumatic tyres and particularly to those subjected to heavy loads.

According to this invention, a pneumatic tyre comprises beads arranged to be retained within flanges of a wheel rim, and side walls arranged to extend from said beads over the outside of said flanges towards the axis of the wheel and which are thereafter curved outwardly away from the wheel axis to meet the tyre tread. With this arrangement, the rim flanges are

located in channels formed in the cover between the beads and the inwardly extending parts of the side wall, and it is found that this greater area of contact between the beads and rim flanges produces a much more stable tyre permitting the use of lower air pressures.

The invention also includes an arrangement in which the broadest part of the air chamber is close to the beads and extends beyond the width of the rim but not necessarily towards the axis as stated above, which shape of air chamber is maintained by reinforcing members secured to the side walls of the tyre cover or inner tube.

Another feature of the invention consists in that the carcass of the tyre is so shaped as to provide an air chamber, which, in addition to extending radially outwards from said rim, also extends outside said flanges towards the axis of the wheel. This arrangement permits an air chamber of large cross-sectional area to be obtained, without necessitating the selection of any particular height of the tyre cover above the wheel rim, and also provides a load bearing area of greater sectional width than heretofore possible.

As already indicated, reinforcing members may be arranged to engage said side walls so as to maintain them in the above mentioned shape when the tyre is inflated. Preferably, the reinforcing members are arranged to extend circumferentially along the side walls of the carcass, or of the inner tube. The reinforcing members are formed from inextensible material, such as steel wire, or from cords.

A still further feature of the invention consists in that the diameter of the circumferential reinforcing members is less than the greatest diameter of the bead. This feature is of particular importance when the base beads are spaced wide apart, since it prevents them from being forced together by lateral thrust.

A still further feature of the invention consists in that the overall width of the air chamber is greater than the sectional height of the air chamber outside the base bead seatings of the rim.

A still further feature of the invention consists in that the contour of the air chamber as it extends from one reinforcing member to another, is a flattened curve as distinct from circular.

The accompanying drawing illustrates a number of cross-sections of tyres constructed according to this invention, as compared with a standard tyre.

Figure 1 illustrates cross-sections of different tyres having the same centre line height, but having different widths. It will be appreciated that the further the cross-sectional contour of the air chamber departs from circular, the greater is the tendency of the air pressure to draw together the sides of the carcass and the beads. However, as already indicated earlier in the specification, the flanges 1 of the wheel rim 2, are located in channels 3 formed between the beads 4 of the tyre and a part 5 of the tyre which extends over the outside of the flanges in a direction towards the axis of the wheel. This latter part of the tyre is reinforced by steel wires 6 arranged to extend circumferentially along the side walls of the cover close to the beads, the diameter of which circumference is less than the greatest diameter 7 of the circumferential beads 4, which thus prevent the part of the tyre 5 being forced upwards away from the flange when the tyre is inflated or when the tyre is subjected to lateral thrust. The width of the tyre can be large as compared with its height, since the tension in the upper part of the carcass 8 tending to draw the beads together, merely has the effect of drawing the reinforced part of the tyre 5 against the rim flange 1. It will also be appreciated that in obtaining the required cross-sectional area of the air chamber to carry a given load by making its width greater than its height, the resistance to lateral rolling is very much increased. Nevertheless, if a tyre is required having relatively greater heights than that shown in Figure 1, and yet to withstand lateral roll, it can be obtained according to this invention as shown in Figure 2, which illustrates a number of cross-sections arranged to carry the same load and having similar overall widths but different heights. It will be noted, however, than in each case, the height is considerably less than of a standard cover for the same load, which standard cover is shown in dotted lines extending downwardly below the other outlines.

Figure 3 shows a cross-section of a standard construction of tyre having a carcass 3.5 inches wide and an air chamber three inches in maximum width, whereas, Figure 4 shows a section of a tyre accordng to the present invention for replacing that of Figure 3, and for use on the same rim. The tread diameter in each case is the same, but the overall width of the tyre of Figure 4 is five inches. A larger air chamber is thus produced and a lower air pressure may be employed, or a heavier load may be carried with the same air pressure.

It will be noted in Figures 1, 2 and 4

that the reinforcing members 6 are shown vulcanised to the inner surface of the cover. Alternatively, the reinforcing members could be vulcanised to the outside of the cover. They may, however, be located between the plies of cords 8, as shown in Figure 4a.

The construction shown in Figure 5 is suitable for a tyre 22 inches wide and has a centre line height of only 8½ inches. This form of tyre is particularly suitable for carrying very heavy loads over soft surfaces.

Figure 6 shows a section of a tyre suitable for use on railway vehicles or road rail vehicles. In this construction, the contour of the outer part of the air chamber between the circumferential reinforcing members 6 is arranged to be either an arc of a circle having a large radius, or a flattened curve shape, in order than when the tread is in a loaded condition, it may flatten out circumferentially along the rail as well as laterally of the rail, thus providing a larger area of rail contact over which the load is distributed. The required cross-sectional area of the air chamber to carry a given load can be obtained according to this invention with a very low centre line height of the tyre.

In the construction shown in Figure 7, the circumferential reinforcing members are secured to the inner tube 5 and, before the tyre is inflated, the reinforced parts of the tube are placed within those parts of the side walls of the tyre which are shaped to extend over the outside of the rim flanges.

The reinforcing members may be formed from inextensible rubber compound, or rubberised fabric, or they may be formed from metal imbedded in a suitable rubber compound or from rubberised fabric vulcanised to the tube.

The construction shown in Figure 8 embodies an inner tube, the inner circumference of which is formed from metal and shaped to maintain the sides of the outer cover in a position over the side flanges of the rim.

Dated this 16th day of February, 1933.
BOULT, WADE & TENNANT,
Chartered Patent Agents,
111 & 112, Hatton Garden, London,
E.C.1.

PROVISIONAL SPECIFICATION.

No. 5178, A.D. 1934.

Improvements in or relating to Pneumatic Tyres.

I, JOHN MACMILLAN, a British Subject, of 139, Station Road, Hendon, London, N.W. 4, do hereby declare the nature of this invention to be as follows:—

This invention is for improvements in or relating to pneumatic tyres and particularly to those subjected to heavy loads.

According to this invention, a pneumatic tyre comprises beads arranged to be retained within flanges of a wheel rim, side walls arranged to extend from said beads outwardly over said flanges and reinforcing members attached to the inside of said side walls so as to maintain the outward extension thereof over the flanges.

A feature of the invention consists in that the reinforcing members are secured around each side wall by being located in the bend of a strip or strips of fabric folded upon itself and vulcanised to said side wall. Preferably, the parts of the strip extending from the bend are directed towards the tread of the tyre and are of a different length so as to prevent objectionable ridges being formed on the inside of the cover.

The side walls of the cover, in addition to extending outwardly over said flanges, extend downwardly towards the wheel axis and thereafter are curved outwardly away from the wheel axis to meet the tyre tread. With this arrangement, the rim flanges are located in channels formed on the cover between the beads and the inwardly extending parts of the side wall and it is found that this greater area of contact between the beads and the rim flanges produces a much more stable tyre permitting the use of lower air pressures. Preferably, the broadest part of the air chamber is close to the beads and extends beyond the width of the rim but not necessarily towards the axis as stated above, which shape of air chamber is maintained by the aforesaid reinforcing members which are secured to the side wall outside the flanges.

The air chamber within the tyre, in addition to extending outwards from said rim, also extends on the outside of said flanges towards the axis of the wheel. This arrangement permits an air chamber of large cross-sectional area to be obtained without necessitating the selection of any particular height of the tyre above the

wheel rim and also provides a load bearing area of greater cross-sectional width than heretofore possible.

The reinforcing members are arranged to extend circumferentially along the side walls of the carcass and may be formed from inextensible material such as steel wire, or from rubber coated cords or from rubber of the required degree of elasticity, in which latter case the rubber must be capable of resisting stretch at the air pressure used in the tyre.

The diameter of the circumferentially extending reinforcing members is arranged to be less than the greatest diameter of the beads. This feature is of particular importance when the base beads are spaced wide apart, since it prevents them from being forced together by lateral thrust.

Preferably, the overall width of the air chamber is greater than the sectional height of the air chamber outside the base beads seating of the rim.

The contour of the air chamber as it extends from one reinforcing member to another, may be a flattened curve, as distinct from circular.

Dated this 16th day of February, 1934.
BOULT, WADE & TENNANT,
Chartered Patent Agents,
111 & 112, Hatton Garden, London,
E.C.1.

COMPLETE SPECIFICATION.

Improvements in or relating to Pneumatic Tyres.

I, JOHN MACMILLAN, a British Subject, of 139, Station Road, Hendon, London, N.W. 4, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention is for improvements in or relating to pneumatic tyres and particularly to those subjected to heavy loads.

According to this invention, a pneumatic tyre is characterised in that the base beads are so shaped as to have a substantial bearing area on the external periphery of the wheel rim that supports them and to engage the upstanding flanges of said rim and each of which base beads across the bearing area has a thickness greater than the thickness of the side walls of the tyre and in that the side walls and the air chamber enclosed by them are arranged to extend from said base beads outwardly over the flanges, and in that reinforcing members are arranged to maintain the outward extension of said side walls over the flanges.

One feature of the invention consists in that said side walls, in addition to extending outwardly over said flanges extend downwardly towards the wheel axis and thereafter are curved outwardly away from the wheel axis to meet the tyre tread. With this arrangement, the rim flanges are located in channels formed on the cover between the beads and the inwardly extending parts of the side wall, and it is found that this greater area of contact between the beads and rim flanges produces a much more stable tyre permitting the use of lower air pressures. This feature is of particular importance when the base beads are spaced wide apart, since it prevents them from being forced together by lateral thrust, especially when the diameter of the circumferential reinforcing members is less than the greatest diameter of the bead or the rim flange.

The invention also includes an arrangement in which the broadest part of the air chamber is close to the beads and extends beyond the width of the rim but not necessarily towards the axis as stated above, which shape of air chamber is maintained by the aforesaid reinforcing members secured either to the side walls of the tyre cover or to the inner tube.

Another feature of the invention consists in that the carcass of the tyre is so shaped as to provide an air chamber, which, in addition to extending radially outwards from said rim, also extends outside said flanges towards the axis of the wheel. This arrangement permits an air chamber of large cross-sectional area to be obtained, without necessitating the selection of any particular height of the tyre cover above the wheel rim, and also provides a load bearing area of greater sectional width than heretofore possible.

As already indicated, reinforcing members are arranged to engage said side walls so as to maintain them in the above mentioned shape when the tyre is inflated. Preferably, the reinforcing members are arranged to extend circumferentially along the side walls of the carcass, or of the inner tube. The reinforcing members are formed from inextensible material, such as steel wire, or from rubber coated cords or from rubber of the required degree of elasticity, i.e. it must be capable

of resisting stretch at the air pressure used in the tyre.

A still further feature of the invention consists in that the overall width of the air chamber is greater than the sectional height of the air chamber outside the base bead seatings of the rim.

A still further feature of the invention consists in that the contour of the air chamber as it extends from one reinforcing member to another is a flattened curve as distinct from circular.

A still further feature of the invention consists in that the reinforcing members are secured to each side wall of the cover by being located in a bend of a strip of fabric folded upon itself or in a bend formed in a number of superimposed strips, which strip, or strips, is, or are, vulcanised integral with the side wall. Preferably, those parts of the strip which extend from the bend are directed towards the tread and are of different lengths so as to prevent objectionable ridges being formed on the inside of the cover.

The following is a description of a number of embodiments of the invention, reference being made to the accompanying drawings, in which :—

Figure 1 illustrates cross-sections of different tyres having the same centre-line height but having different widths;

Figure 2 shows cross-sections of a number of covers having different heights but embodying the same basic features;

Figure 3 is a cross-section of a standard tyre mounted on a well-base rim;

Figure 4 shows a cross-section of a tyre according to the present invention mounted on the same rim as shown in Figure 3;

Figure 5 shows a cross-section of a similar tyre to that shown in Figure 4, but mounted upon a split flat base rim;

Figure 6 shows an alternative method of securing the reinforcing members to the cover;

Figure 7 is a cross-section of an extra wide tyre;

Figure 8 shows a section of a tyre suitable for use on railway vehicles or road rail vehicles; and

Figure 9 is a similar view to that of Figure 6 showing yet another alternative method of securing the reinforcing members to the cover.

Figure 1 illustrates cross-sections of different tyres having the same centre line height, but having different widths. It will be appreciated that the further the cross-sectional contour of the air chamber departs from circular, the greater is the tendency of the air pressure to draw together the sides of the carcass and the beads. However, as already indicated earlier in the specification, the flanges 1 of the wheel rim 2, are located in channels 3 formed between the beads 4 of the tyre and a part 5 of the tyre which extends over the outside of the flanges in a direction towards the axis of the wheel. This latter part of the tyre is reinforced by steel wires 6, arranged to extend circumferentially along the side walls of the cover close to the beads, the diameter of which circumference is less than the greatest diameter 7 of the circumferential beads 4, which steel wires thus tend to prevent the part of the tyre 5 being forced upwards away from the flange when the tyre is inflated or when the tyre is subjected to lateral thrust. It will be noted that the reinforcements extend over the greater part of those portions of the wall which extend from each outer edge of the rim for the maximum width of the air chamber, and thus prevent those parts from buckling. The width of the tyre can be large as compared with its height, since the tension in the upper part of the carcass 8 tending to draw the beads together, merely has the effect of drawing the reinforced part of the tyre 5 against the rim flange 1. It will also be appreciated that in obtaining the required cross-sectional area of the air chamber to carry a given load by making its width greater than its height, the resistance to lateral rolling is very much increased. Nevertheless, if a tyre is required having relatively greater heights than that shown in Figure 1, and yet to withstand lateral roll, it can be obtained according to this invention as shown in Figure 2, which illustrates a number of cross-sections arranged to carry the same load and having similar overall widths but different heights. It will be noted, however, that in each case, the height is considerably less than that of a standard cover for the same load, which standard cover is shown in dotted lines extending downwardly below the other outlines.

Figure 3 shows a cross-section of a standard construction of tyre having a carcass 3.5 inches wide and an air chamber three inches in maximum width. The construction shown in Figure 4 is suitable for fitting to the same standard rim as shown in Figure 3. It will be noted that the lower part of the side wall emerging from the bead is of the same diameter as the greater diameter of the rim flange which permits of easier fitting. The overall width of this tyre is 4½ inches as compared with 3½ inches of Figure 3 and thus provides a larger air chamber on which a heavier load can be carried or the same load at a much reduced air pressure.

Figure 5 shows a section of a tyre according to the present invention for replacing that of Figure 3, but mounted upon a split flat base rim of the same width and diameter. The tread diameter in each case is the same, but the overall width of the tyre of Figure 5 is five inches. A larger air chamber is thus produced and a lower air pressure may be employed, or a heavier load may be carried with the same air pressure. In this instance, as distinct from Figure 3, the lower parts of the side walls extend toward the wheel axis which arrangement provides greater lateral stability.

It will be noted in Figures 1, 2 and 4, 5 that the reinforcing members 6 are shown vulcanised to the inner surface of the cover. Alternatively, the reinforcing members could be vulcanised to the outside of the cover, They may, however, be located between the plies of cords 9, as shown in Figure 6.

The construction shown in Figure 7 is suitable for a tyre 22 inches wide and has a centre line height of only $3\frac{1}{2}$ inches. This form of tyre is particularly suitable for carrying very heavy loads over soft surfaces.

Figure 8 shows a section of a tyre suitable for use on railway vehicles or road rail vehicles and could replace tyres mounted in twin formation. In this construction, the contour of the outer part of the air chamber between the circumferential reinforcing members 6 is arranged to be either an arc of a circle having a large radius, or a flattened curved shape, in order that when the tread is in a loaded condition, it may flatten out circumferentially along the rail as well as laterally of the rail, thus providing a larger area of rail contact over which the load is distributed. The required cross-sectional area of the air chamber to carry a given load can be obtained according to this invention with a very low centre line height of the tyre.

Figure 9 shows an arrangement whereby the reinforcing members are securely anchored to the carcass of the tyre. This is effected by folding a strip 10 of corded fabric upon itself and arranging the reinforcing members in the bight of the fold. The folded strip is then vulcanised to the inside of the cover on each side wall thereof so that the reinforcing members are located in the required position relatively to the beads as described earlier in the specification and so that the two parts of the strip are directed towards the tread. It will be noted that these two parts are of different lengths so as to prevent an objectionable ridge being formed on the inside of the cover.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. A pneumatic tyre wherein the base beads are so shaped as to have a substantial bearing area on the external periphery of the wheel rim that supports them and to engage the upstanding flanges of said rim and each of which base beads across the bearing area has a thickness greater than the thickness of the side walls of the tyre and wherein the side walls and the air chamber enclosed by them are arranged to extend from said base beads outwardly over the flanges, and wherein reinforcing members are arranged to maintain the outward extension of said side walls over the flanges.

2. A pneumatic tyre according to claim 1, wherein said side walls in addition to extending outwardly over said flanges first extend downwardly towards the wheel axis and thereafter are curved outwardly away from the wheel axis to meet the tyre tread.

3. A pneumatic tyre according to either of the preceding claims, wherein the walls of the tyre are so arranged that the broadest part of the air chamber is close to the beads and extends beyond the width of the rim.

4. A pneumatic tyre according to claim 3, wherein the air chamber, in addition to extending beyond the width of the rim, also extends on each side of the rim towards the axis of the wheel.

5. A pneumatic tyre according to any of the preceding claims which, in cross-section, is characterised in that those portions of the wall which extend from each outer edge of the rim to the maximum width of the air chamber are reinforced for the greater part of such extent by said reinforcing members.

6. A pneumatic tyre according to any of the preceding claims, wherein said reinforcing members are either secured to the side walls of the tyre or to the inner tube.

7. A pneumatic tyre according to claim 5 or claim 6, wherein the reinforcing members are arranged to extend circumferentially along the side walls of the tyre or along the side walls of the inner tube.

8. A pneumatic tyre according to claim 7, wherein said reinforcing members are formed from inextensible material such as steel wire, rubber coated cords, or from rubber having the required degree of elasticity.

9. A pneumatic tyre according to any of claims 5 to 8, wherein the diameter of the circumferential reinforcing members is

less than the greatest diameter of the beads.

10. A pneumatic tyre according to any of the preceding claims, wherein the overall width of the air chamber is greater than the sectional height of the air chamber outside the base bead seatings of the rim.

11. A pneumatic tyre according to any of the preceding claims, wherein the contour of the air chamber, as it extends from one reinforcing member to another is a flattened curve, as distinct from circular.

12. A pneumatic tyre according to any of the preceding claims, wherein the reinforcing members are secured to each side wall of the cover by being located in the bend of a strip of fabric folded upon itself or in the bend formed in a number of superimposed strips, which strip, or strips, is, or are, vulcanised around the side wall.

13. A pneumatic tyre according to claim 12, wherein the parts of the strip extending from the bend are directed towards the tread of the cover.

14. A pneumatic tyre according to either of claims 11 or 12 wherein the parts of the strips which extend towards the tread are of different lengths.

15. A pneumatic tyre substantially as described or substantially as shown in the accompanying drawing.

Dated this 16th day of February, 1934.
BOULT, WADE & TENNANT,
Chartered Patent Agents,
111 & 112, Hatton Garden, London,
E.C.1.

Redhill: Printed for His Majesty's Stationery Office, by Love & Malcomson, Ltd.—1934.

Fig. 1.

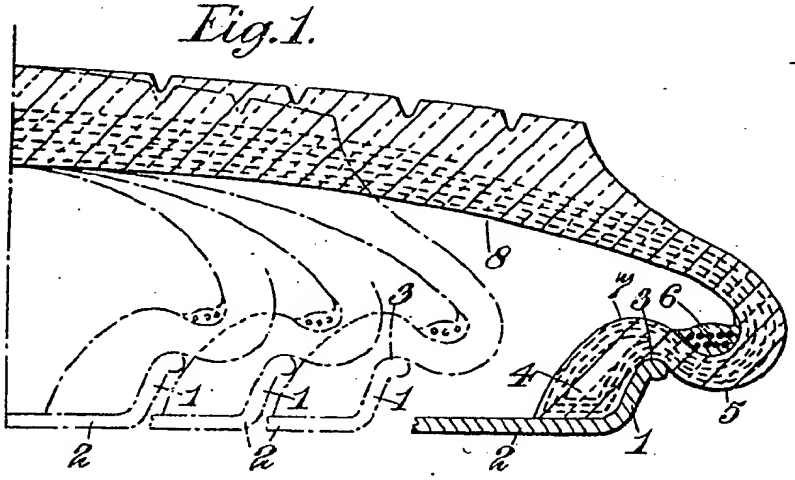


Fig. 2.

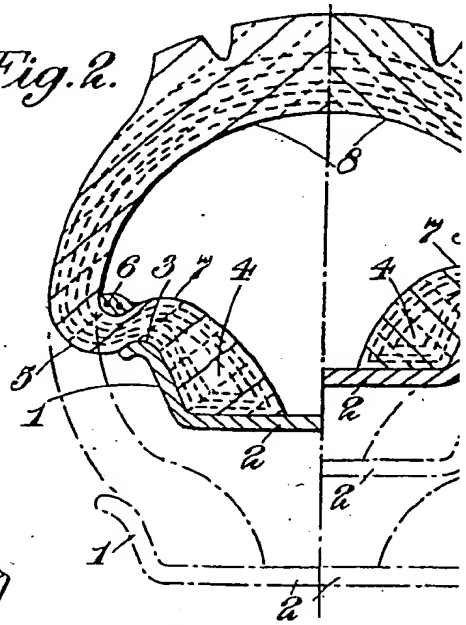


Fig. 4.

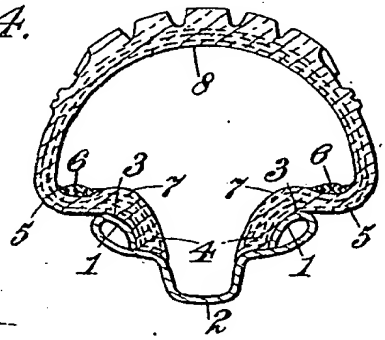


Fig. 9.

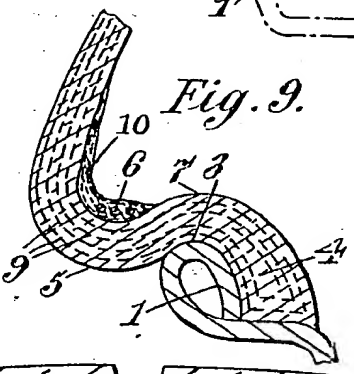
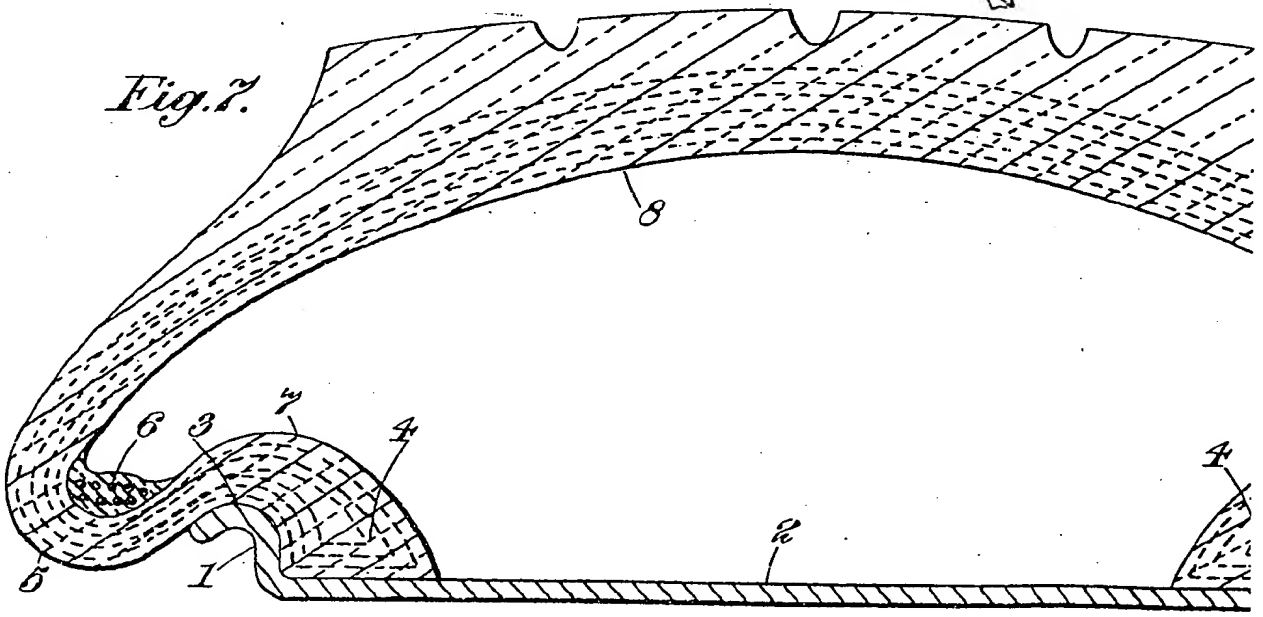


Fig. 7.



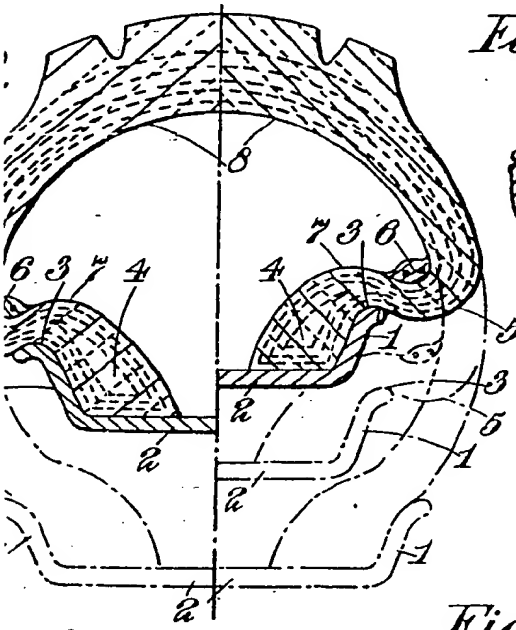


Fig. 3.

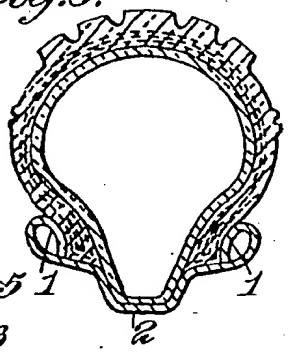
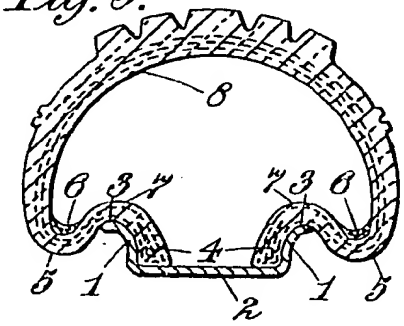


Fig. 5.



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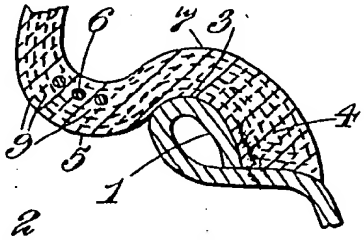

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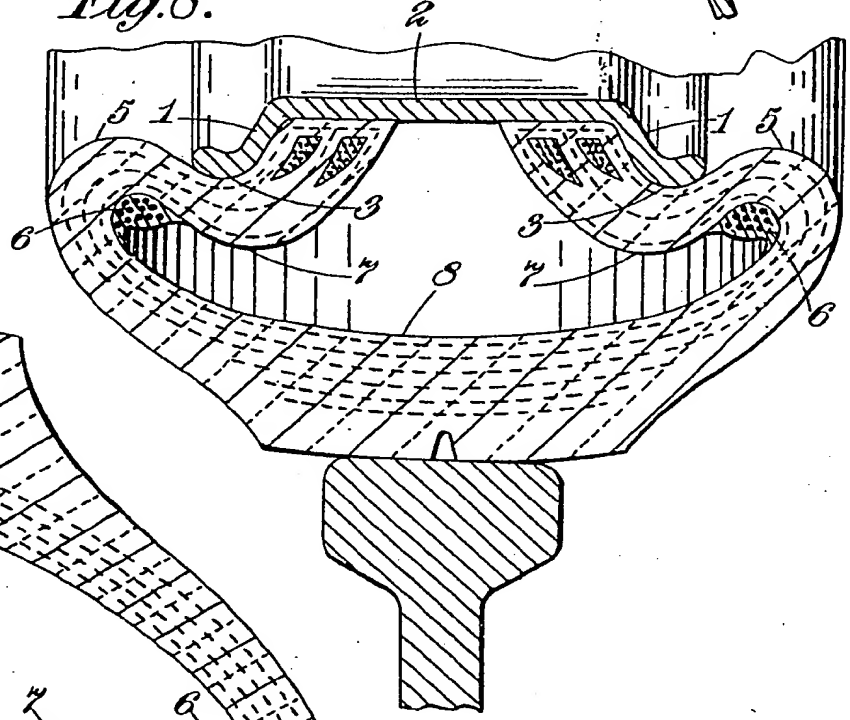

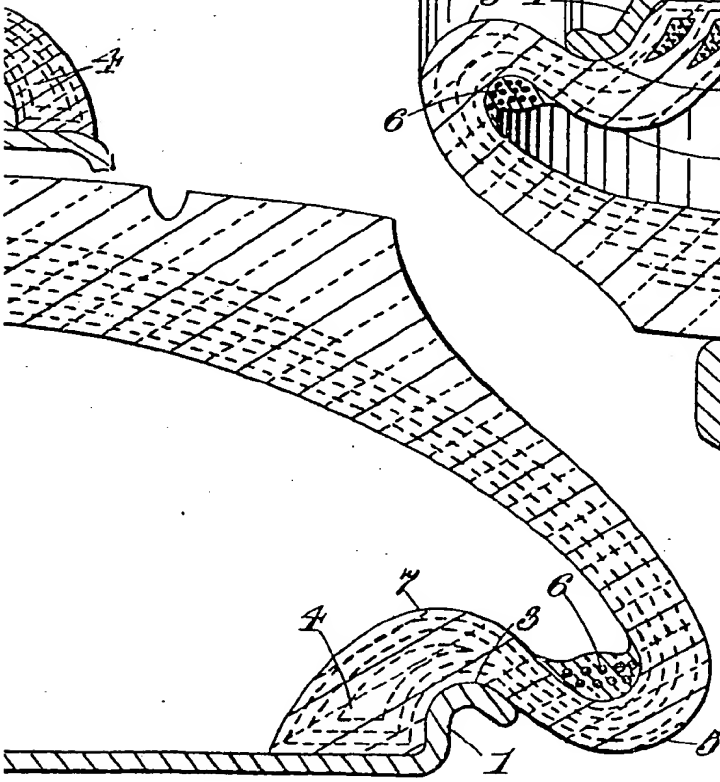

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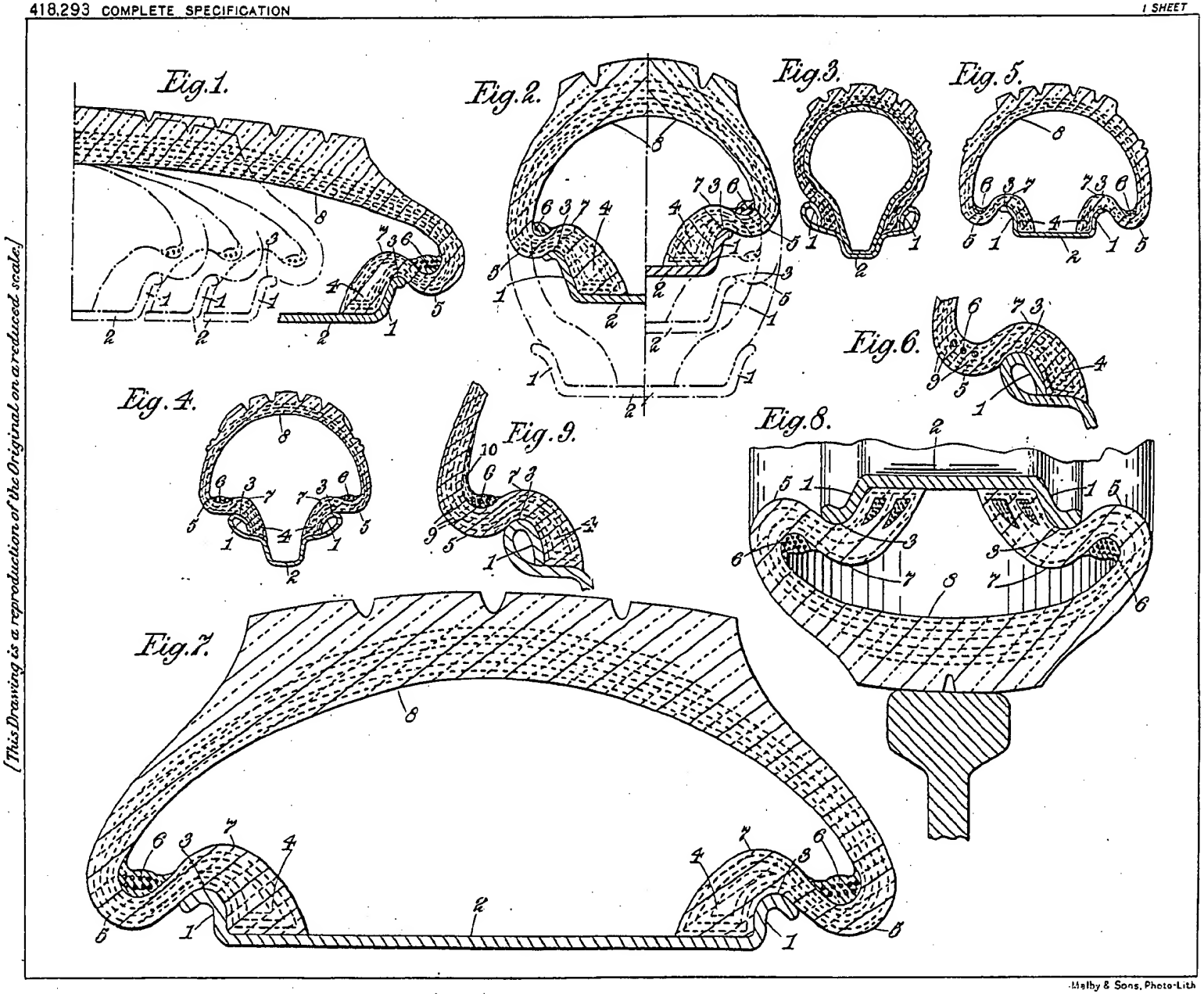

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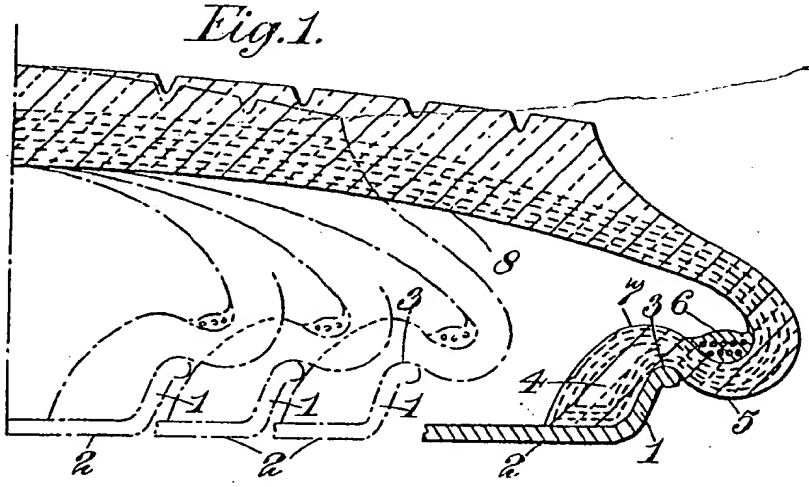
Fig. 1.



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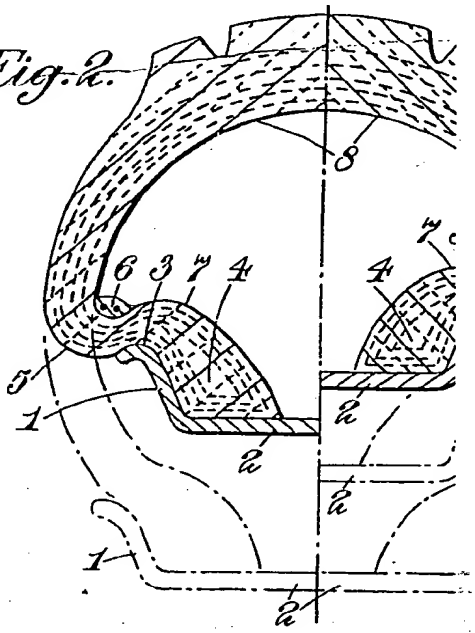

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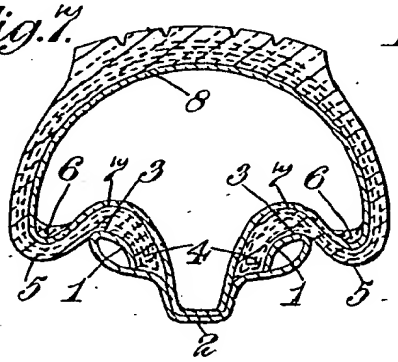

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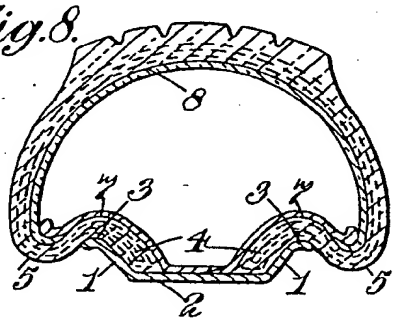

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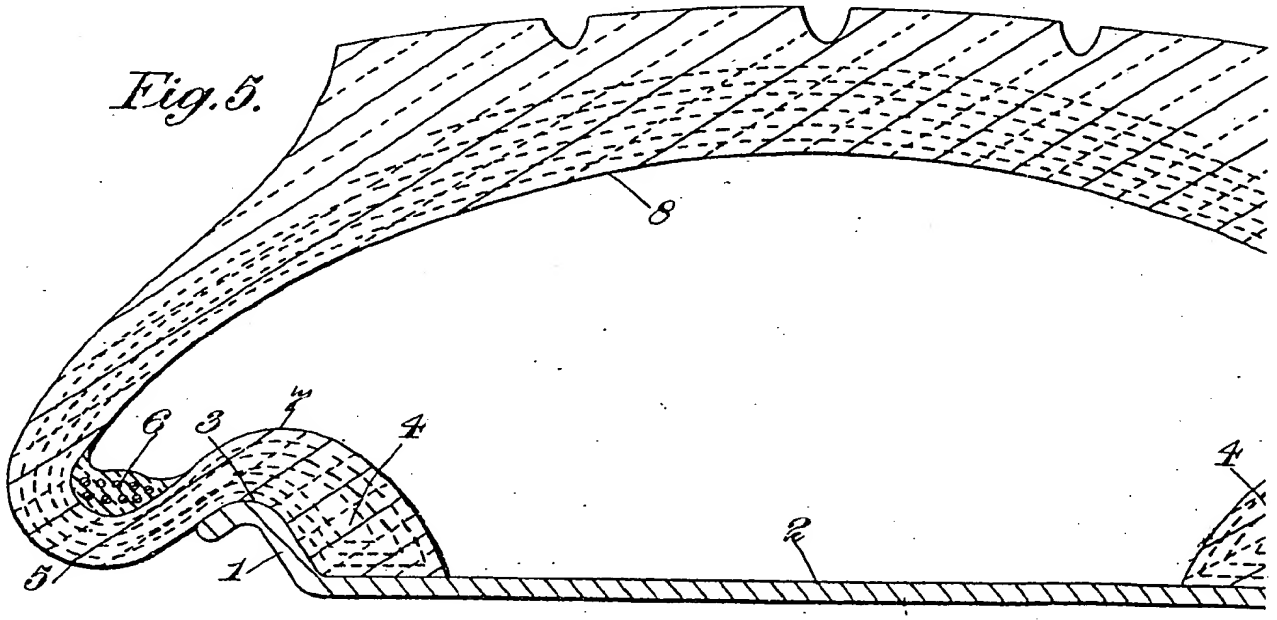
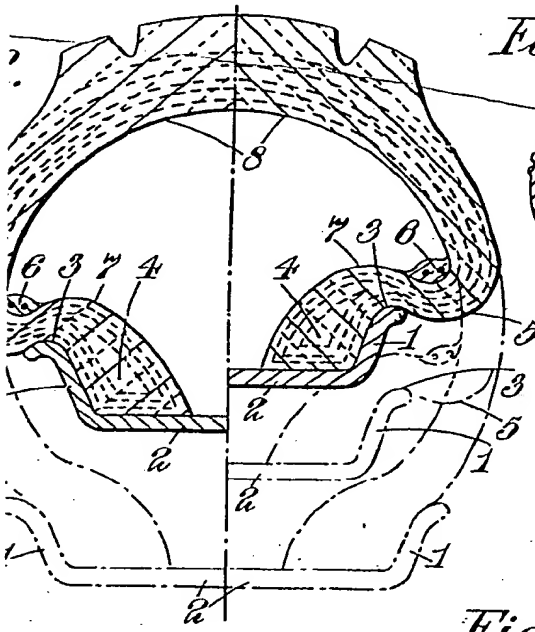


Fig.3.



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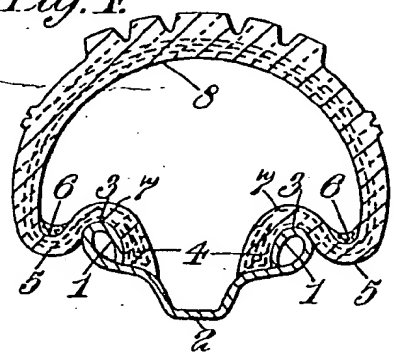
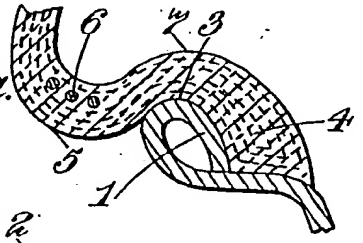


Fig.4a.



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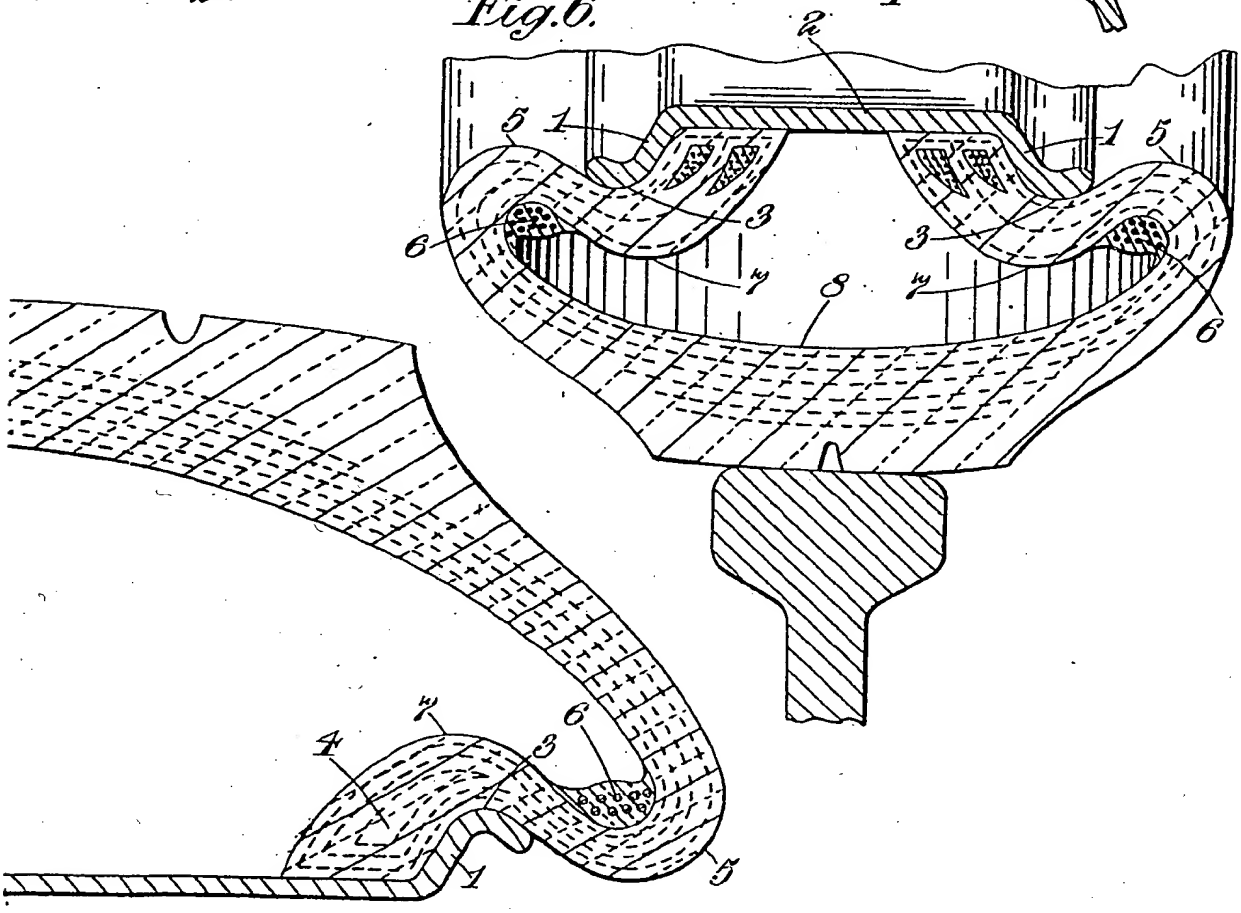

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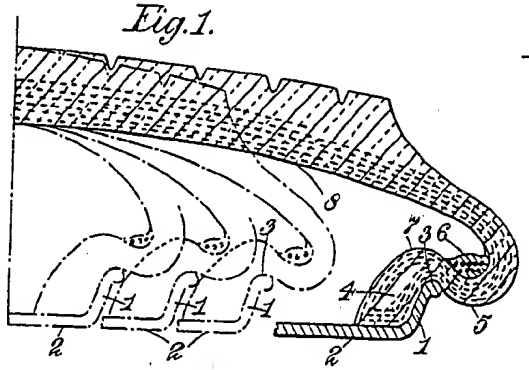
Fig.1.



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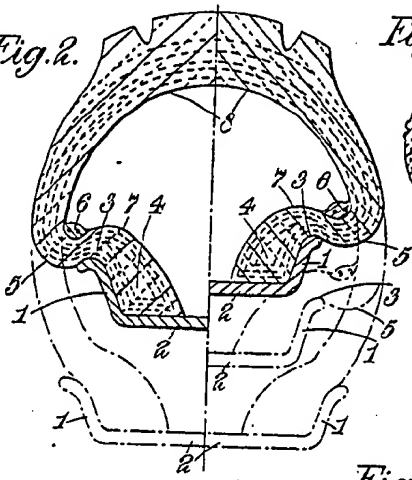

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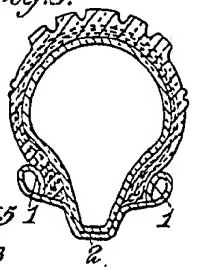

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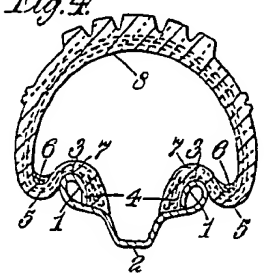

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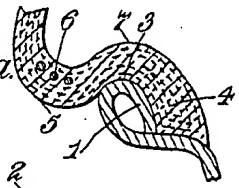

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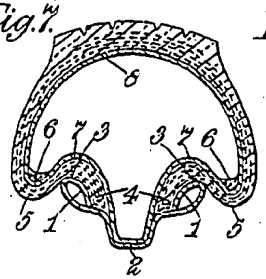

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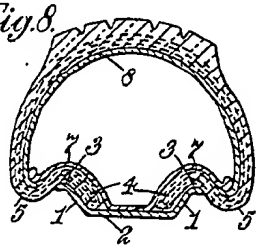

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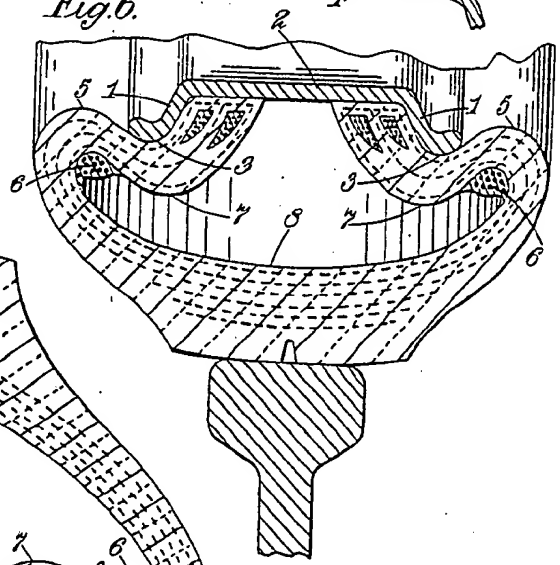

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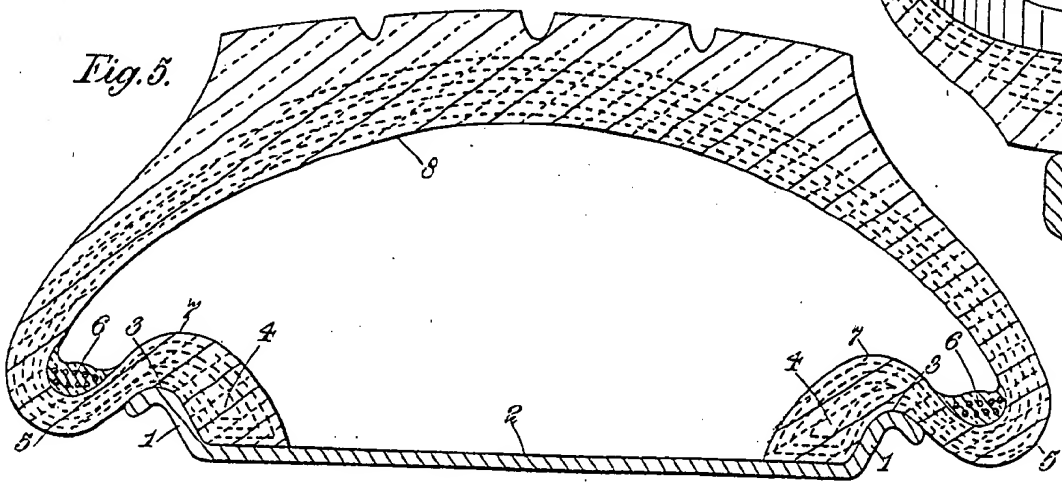

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